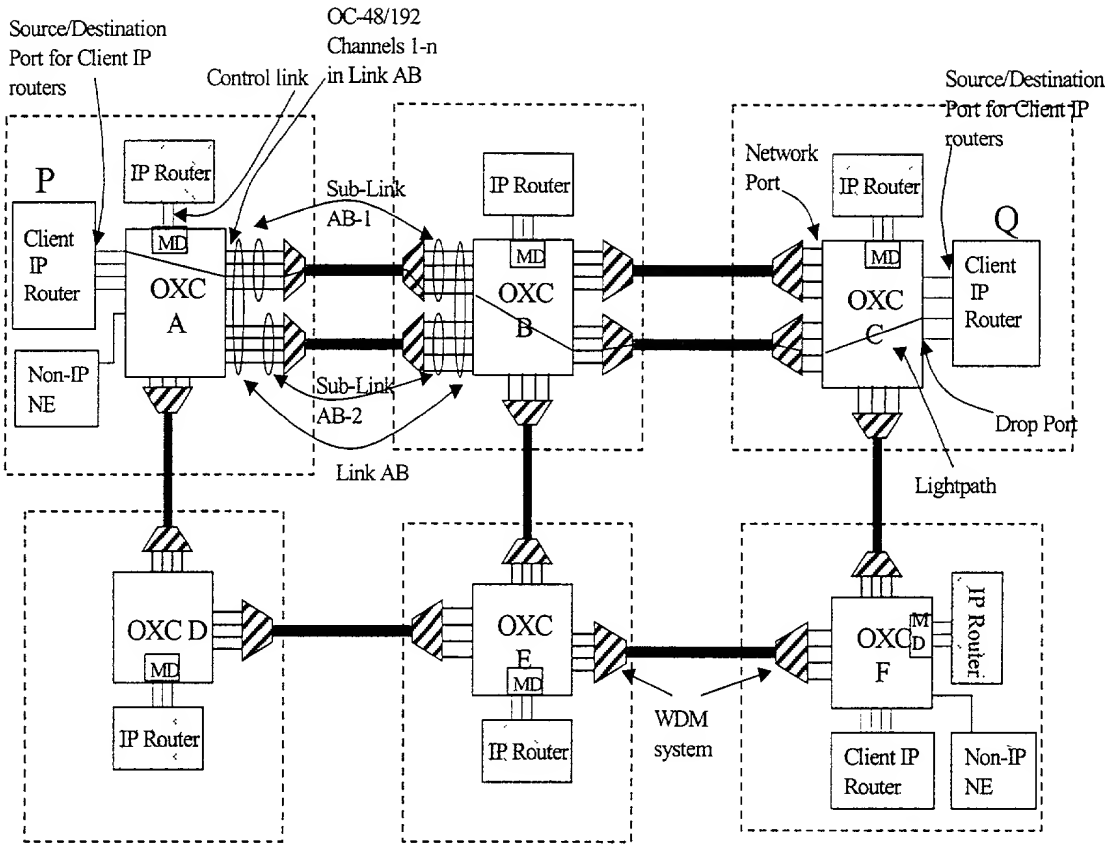

Source/Destination
Port for Client IP
routers
OC-48/192
Channels 1-n
in Link AB
Control link
Source/Destination
Port for Client IP
routers
P
IP Router
Sub-Link
AB-1
IP Router
Network
Port
IP Router
Q
Client
IP
Router
MD
OXC
A
MD
OXC
B
MD
OXC
C
Client
IP
Router
Non-IP
NE
Sub-Link
AB-2
Drop Port
Link AB
Lightpath
OXC D
MD
IP Router
OXC
E
MD
IP Router
WDM
system
OXC
F
MD
IP Router
Client IP
Router
Non-IP
NE

Fig. 1

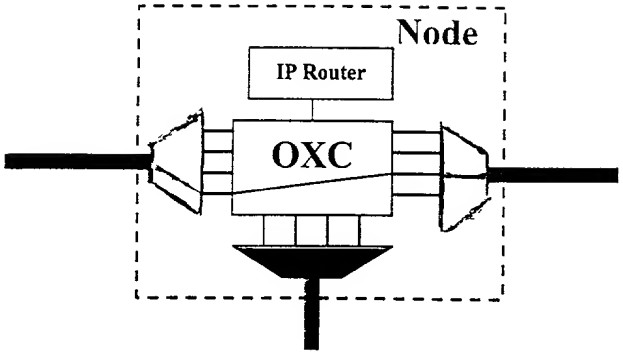


Fig. 2

Page 20 of 26

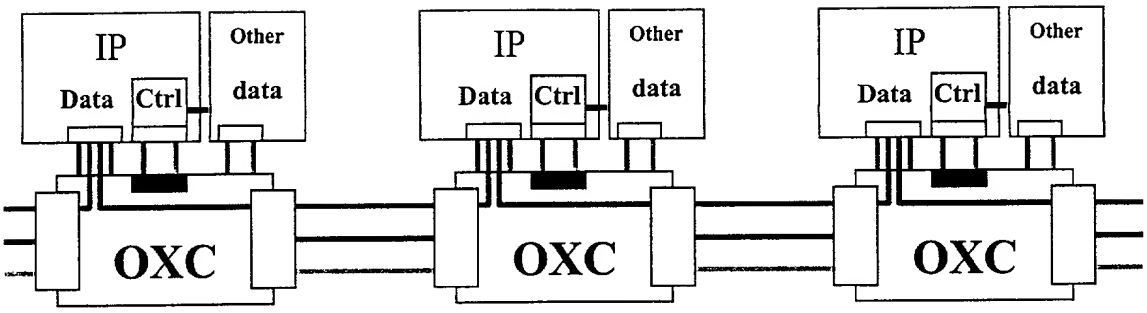


Fig. 3

Docket No. 9000-0000

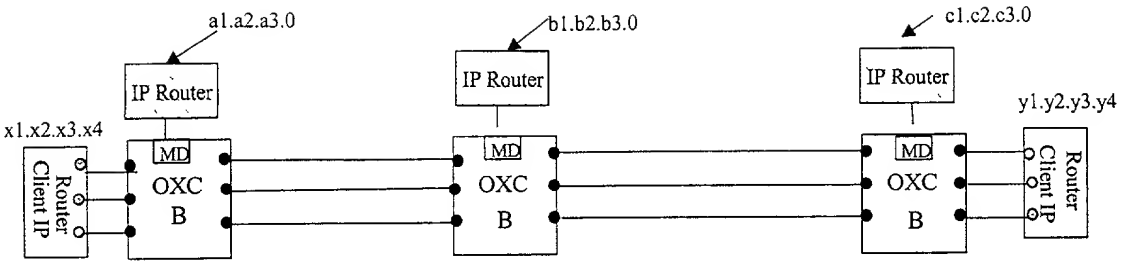


Fig. 4

US 6,868,082 B1

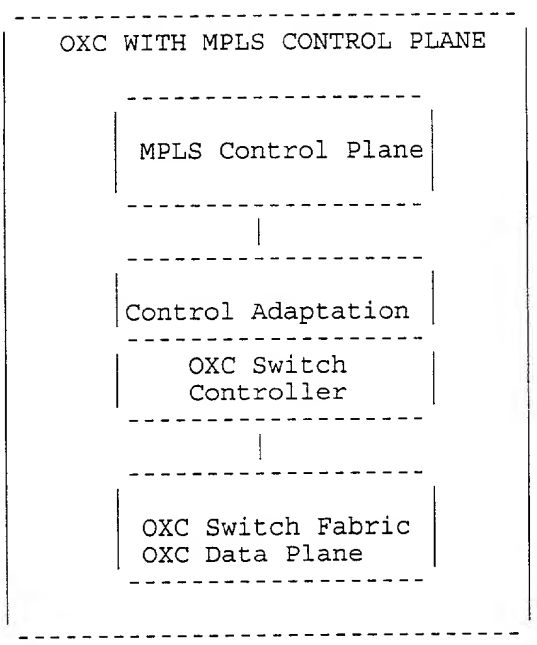
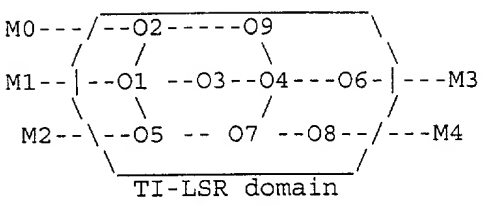

OXC WITH MPLS CONTROL PLANE
MPLS Control Plane
Control Adaptation
OXC Switch Controller
OXC Switch Fabric
OXC Data Plane

Fig. 5



Mk: A TC-LSR (access routers), Ox: A TI-LSR (OXC)

Fig. 6

US 2002/0196805 A1

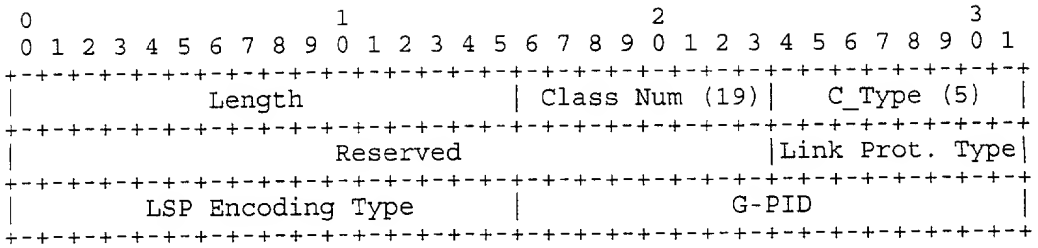


Fig. 7

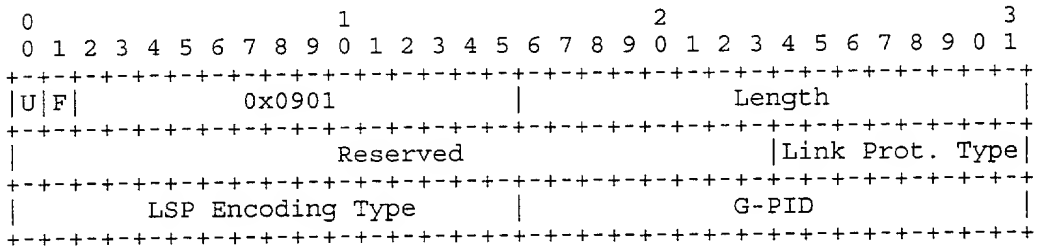


Fig. 8

Exhibit 1009, p. 0009

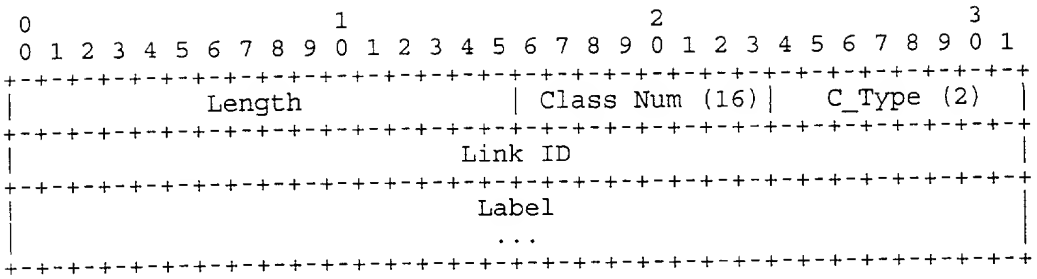


Fig. 9

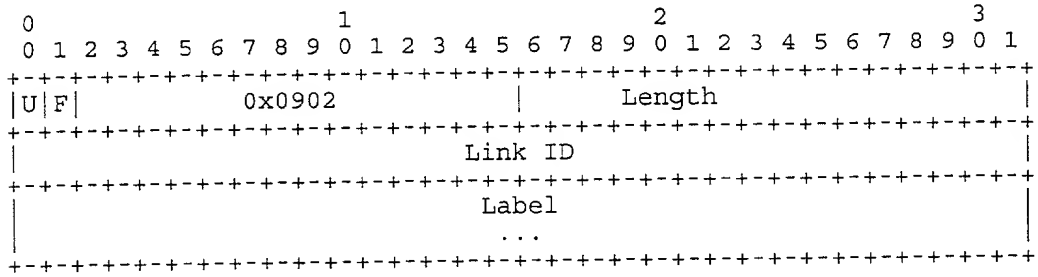


Fig. 10

Petitioner's Exhibit 1002 - Page 0026

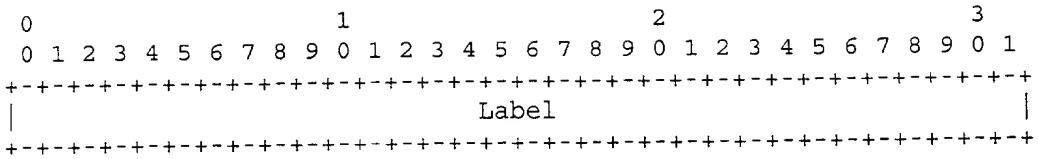


Fig. 11

Docket No. 2000-0208

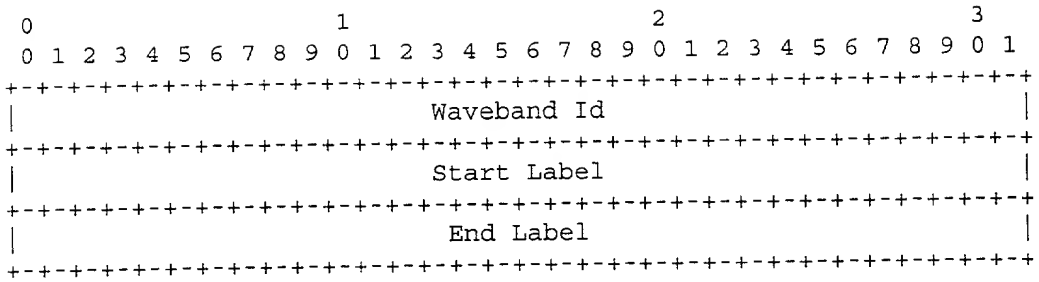


Fig. 12

Page 2 of 2 - Doc 2

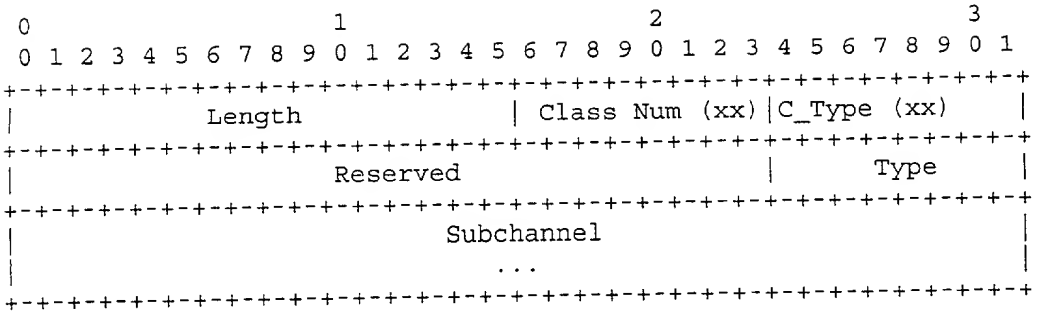


Fig. 13

Docket No. 50277-2000

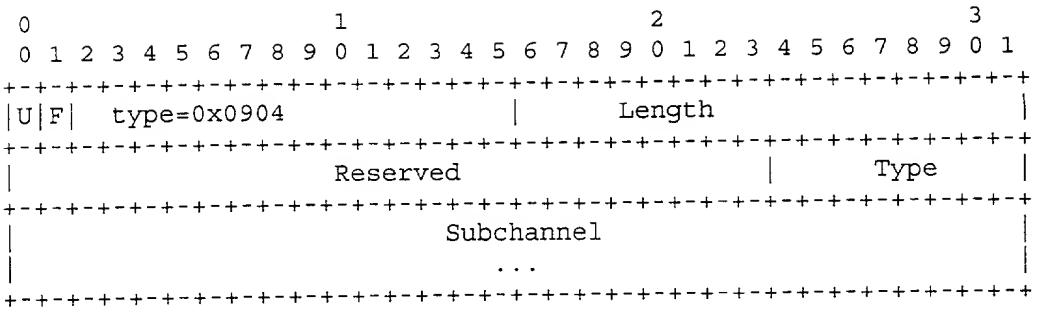


Fig. 14

EXHIBIT 2006

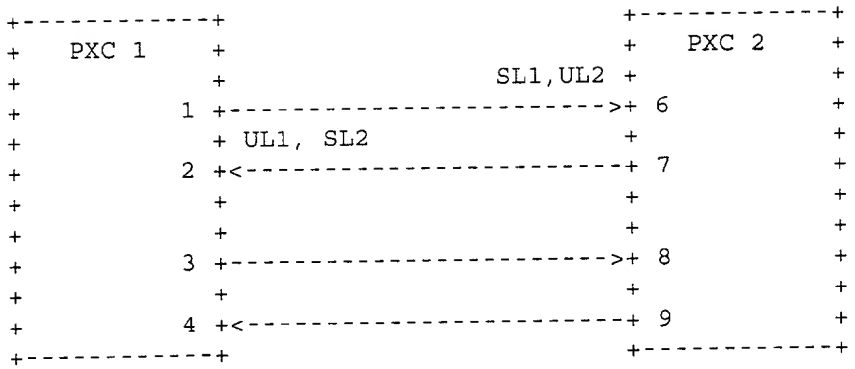


Fig. 15

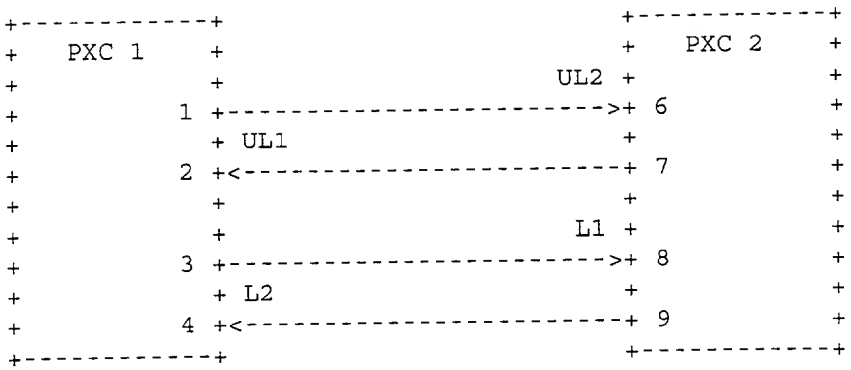


Fig. 14

Patent Application Publication

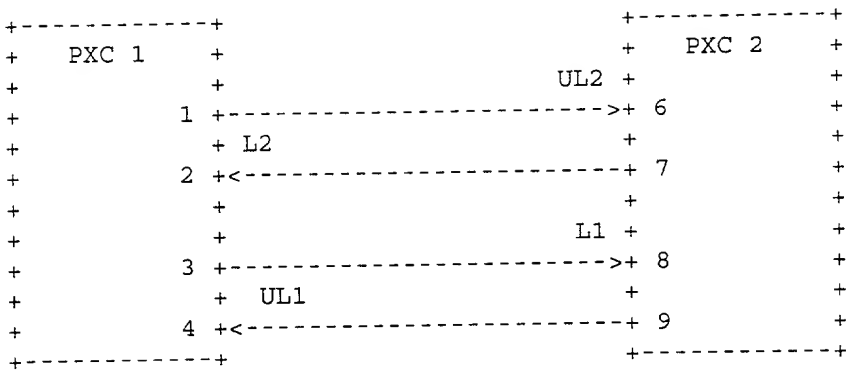


Fig. 17

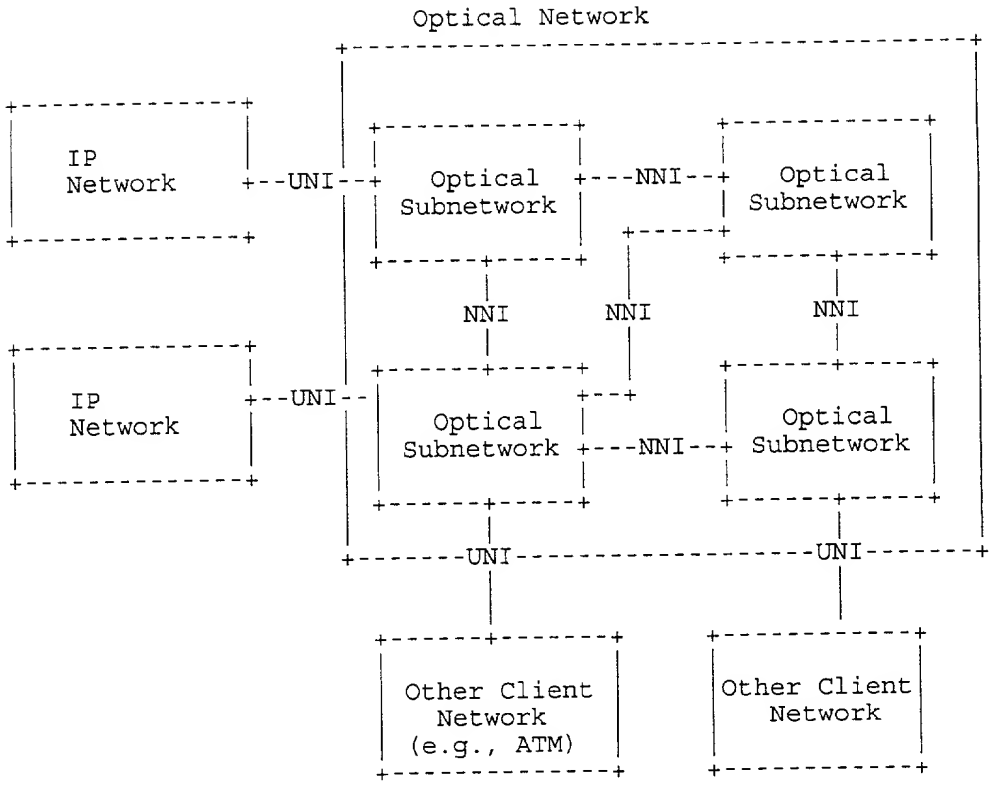

Optical Network
IP Network
UNI
Optical Subnetwork
NNI
Optical Subnetwork
IP Network
UNI
Optical Subnetwork
NNI
Optical Subnetwork
UNI
UNI
Other Client Network (e.g., ATM)
Other Client Network

Fig. 18

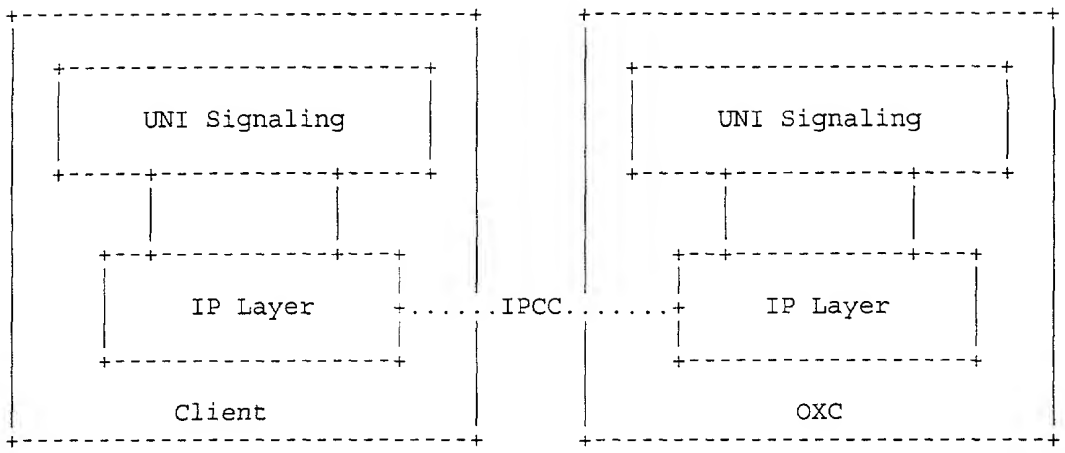


Fig. 19

09090200 "090502

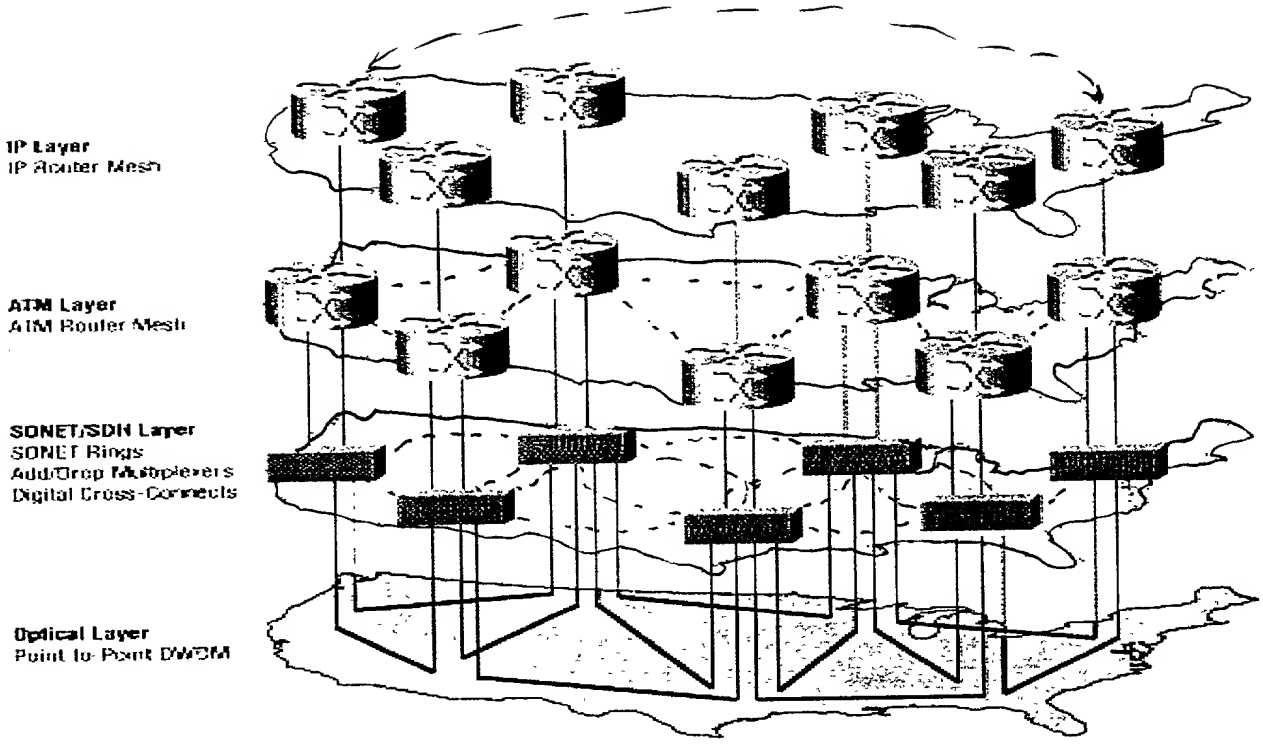


FIG. 20

US 6,826,369 B1

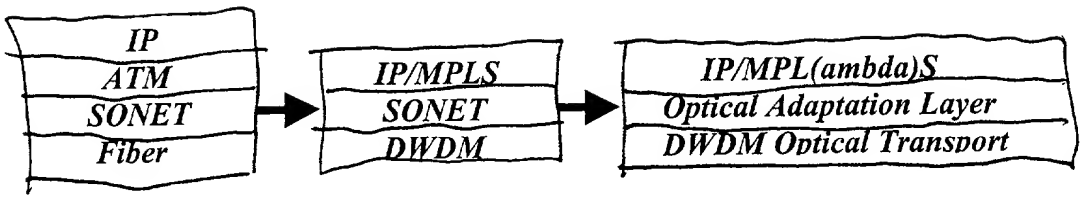

IP
ATM
SONET
Fiber
IP/MPLS
SONET
DWDM
IP/MPL(ambda)S
Optical Adaptation Layer
DWDM Optical Transport

Fig. 21

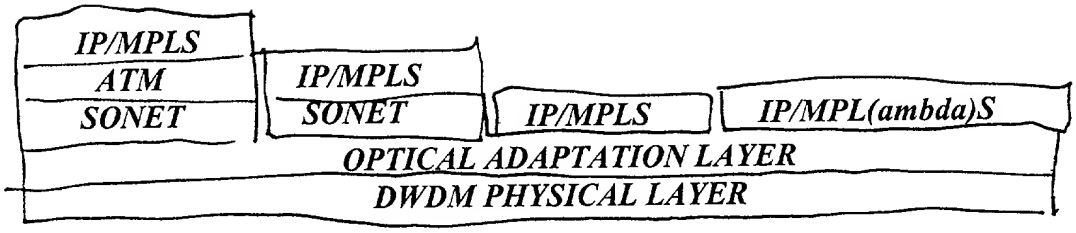
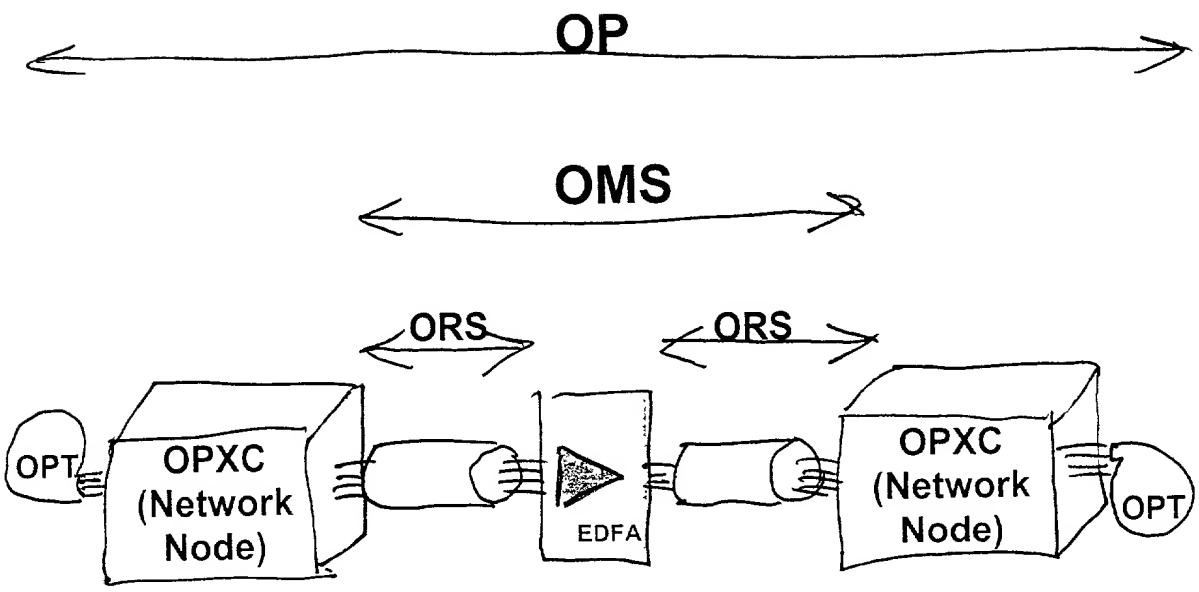


Fig. 22

Docket No. 50277-2000



OP -- Optical Path
OMS -- Optical Multiplexing Section
ORS -- Optical Repeater Section
OPT -- Optical Path Termination
OPXC -- Optical Path Cross-Conect

Fig. 23

Patent Application

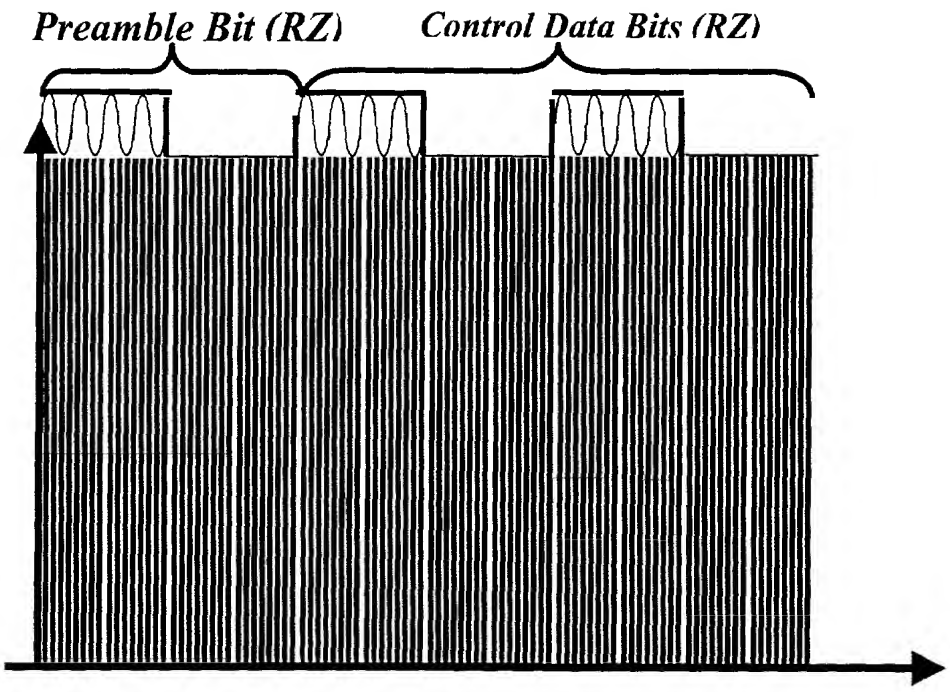


Fig. 24

Page 30 of 30 - 09/25/2006 6:49:09 PM

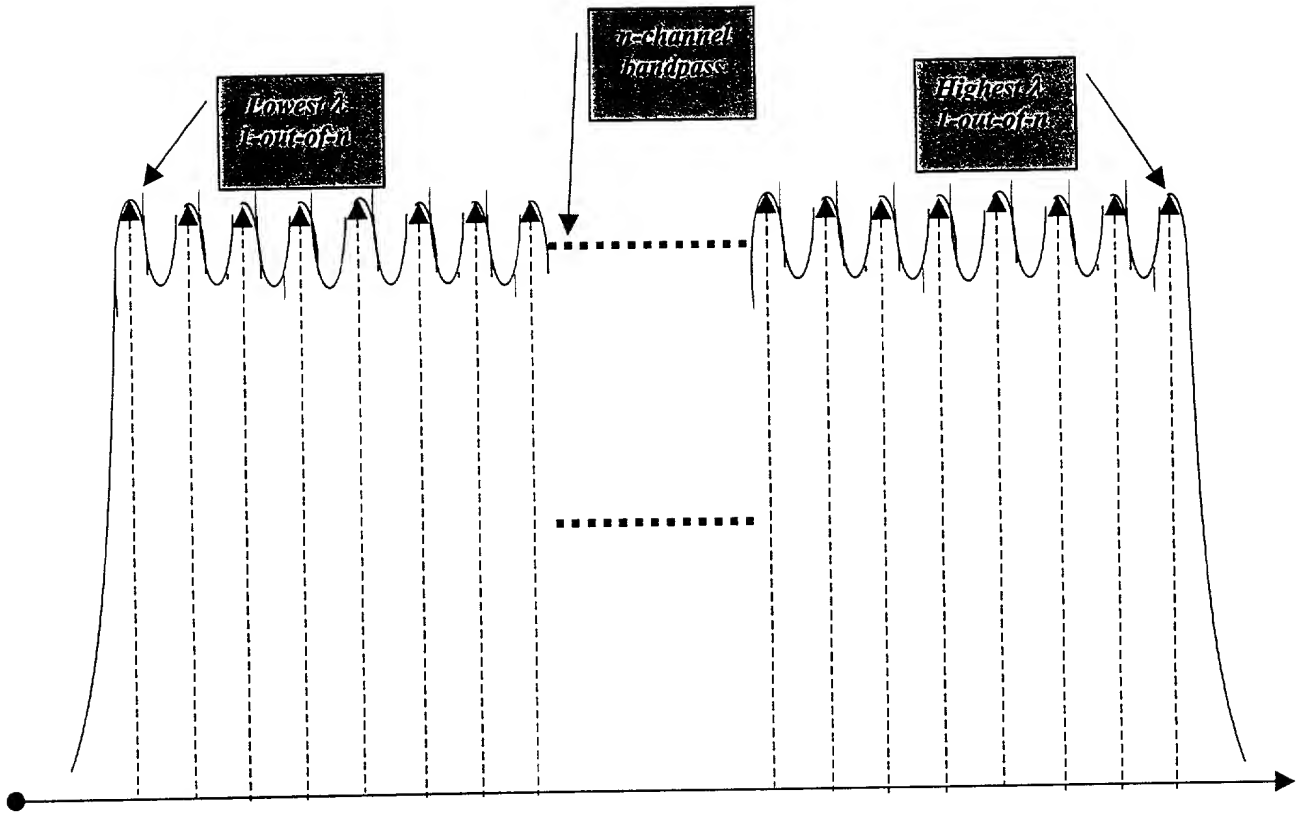


FIG 25

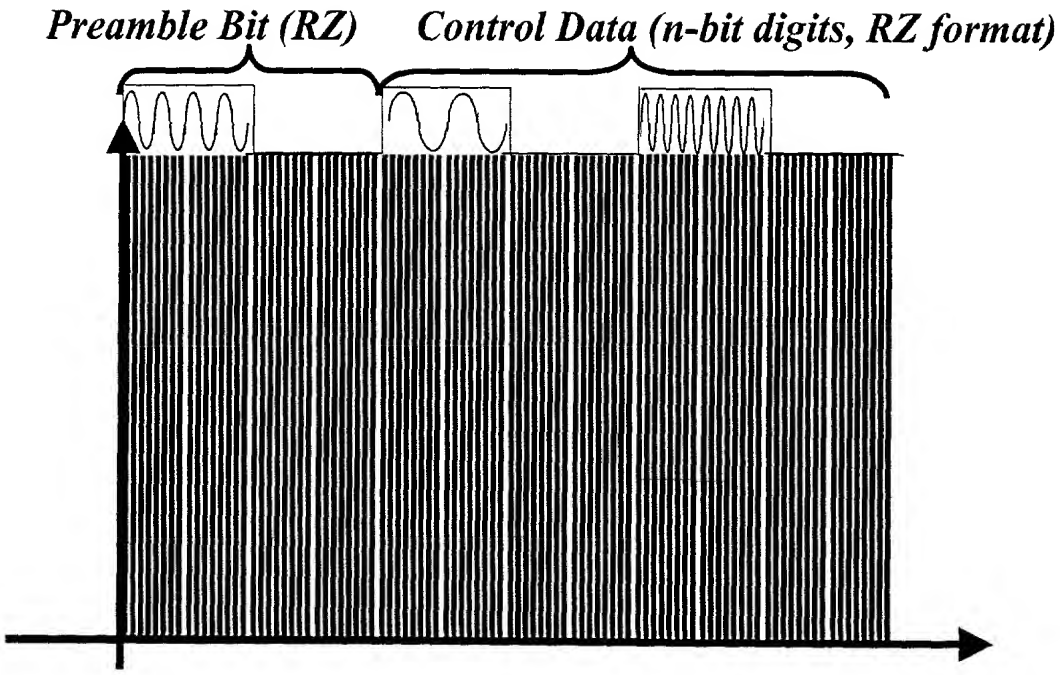


FIG. 26

Docket No. 2002-0302

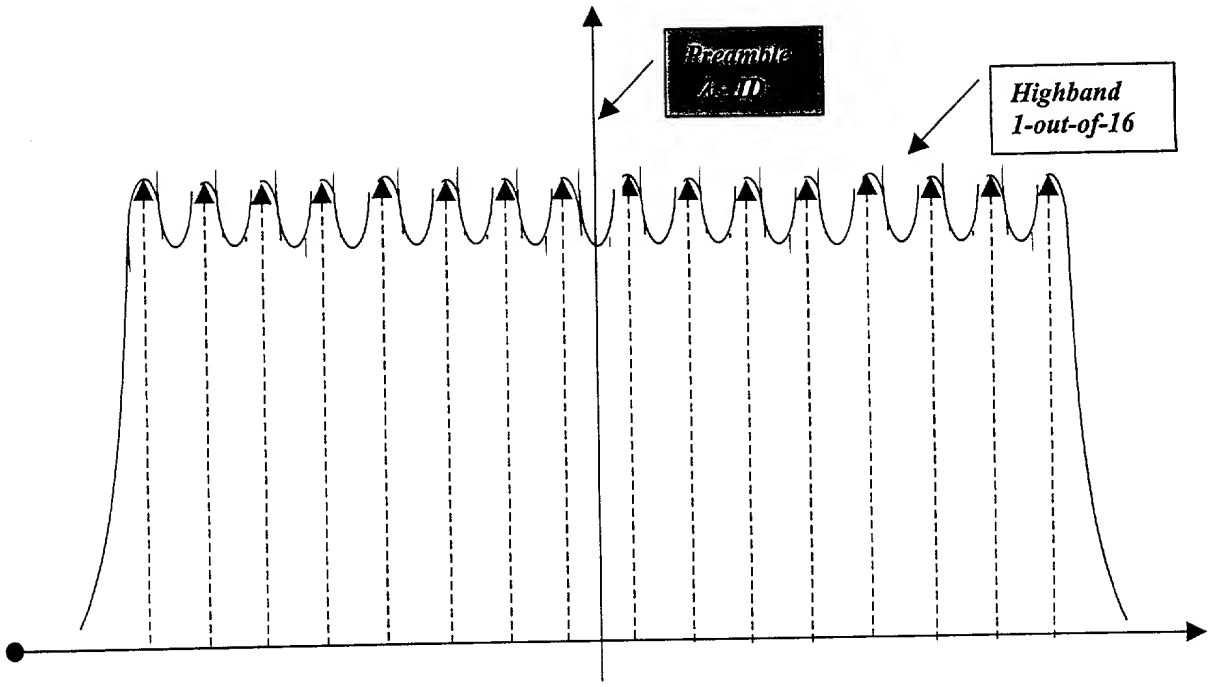


FIG. 27

Express Mail Label No. EV 339 926 650 US

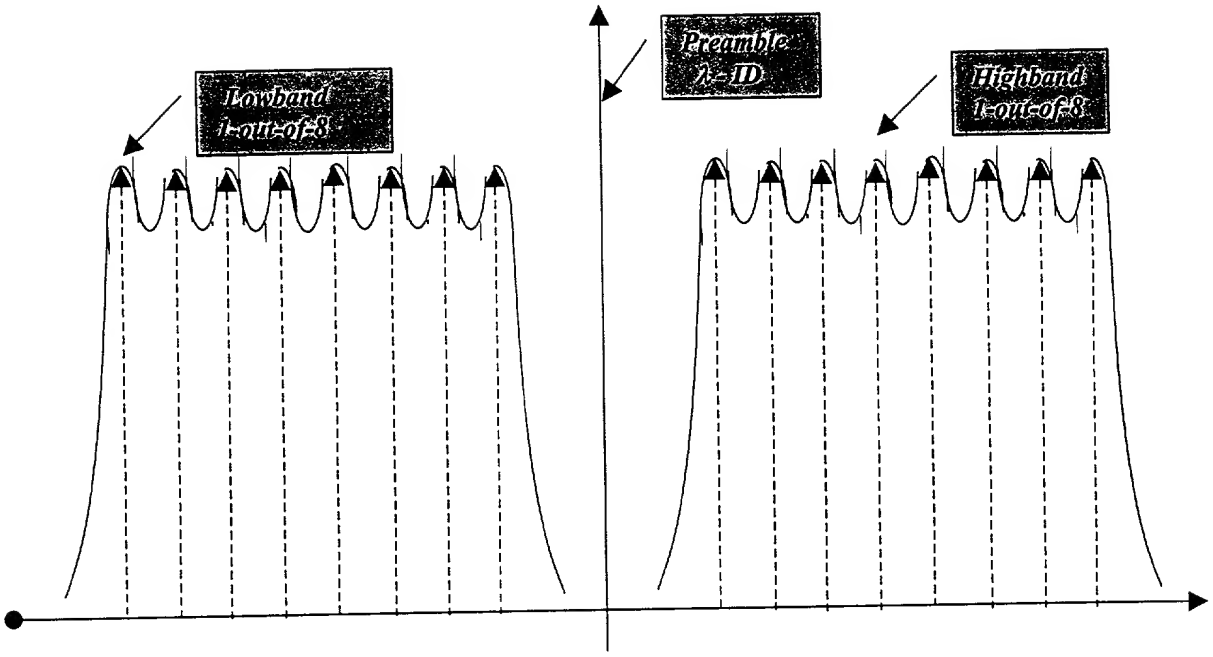


FIG. 28

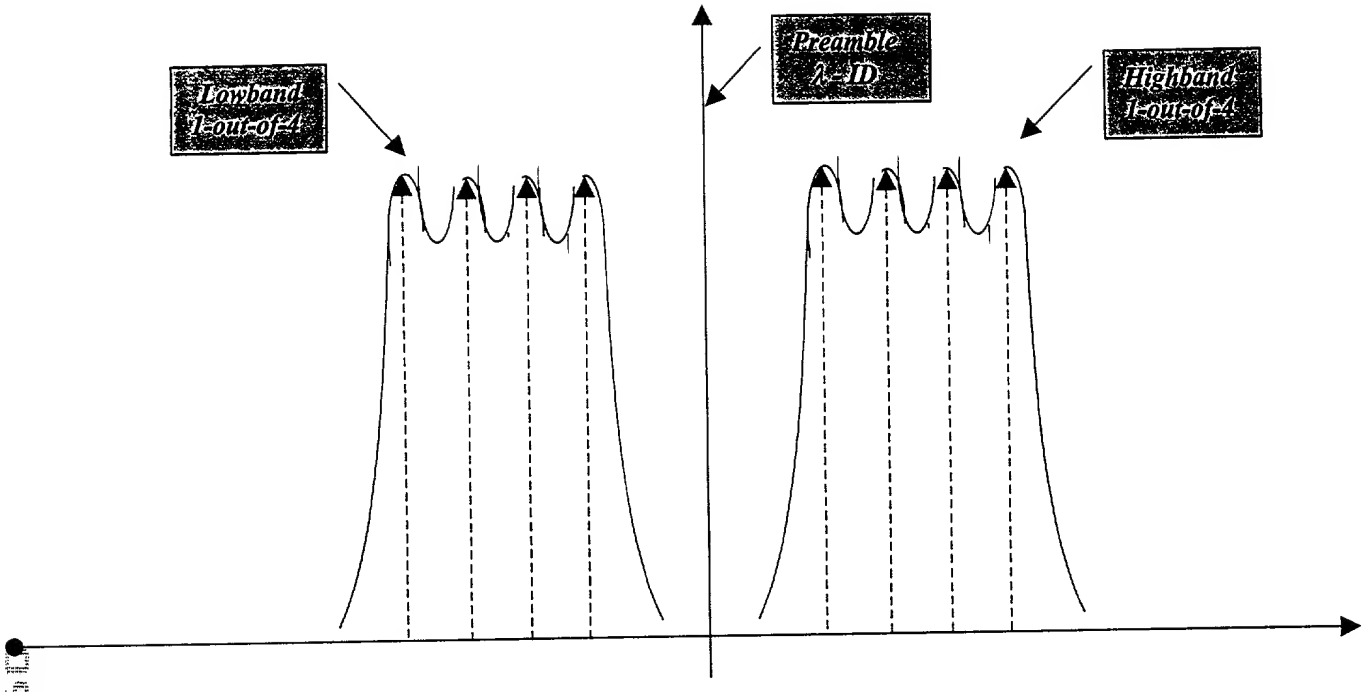


FIG. 29

	120.95kHz	*133.65kHz*	*147.75kHz*	*163.35kHz*
80.15kHz	0000	0001	0010	0011
88.55kHz	0100	0101	0110	0111
97.98kHz	1000	1001	1010	1011
108.21kHz	1100	1101	1110	1111

FIG. 30

Page 1 of 2 - 2/2/2006 2:22:26 PM

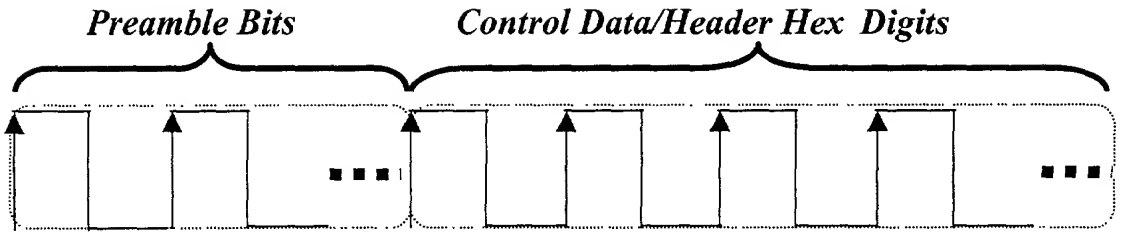


FIG. 31

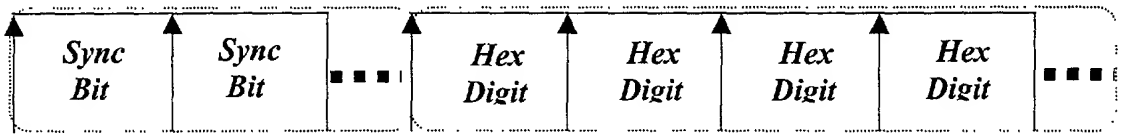


FIG. 32

Patent Application Publication

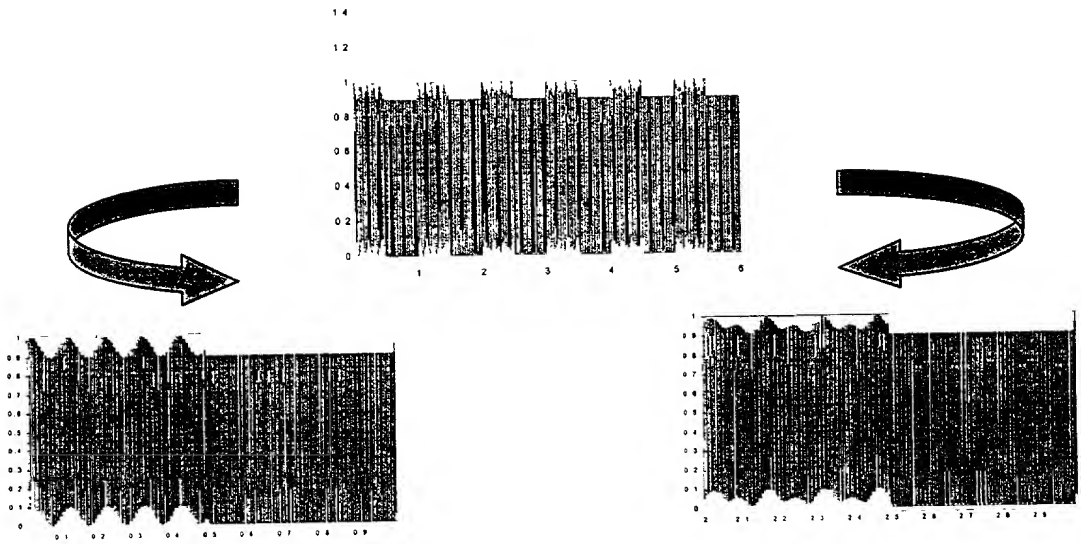


FIG. 33

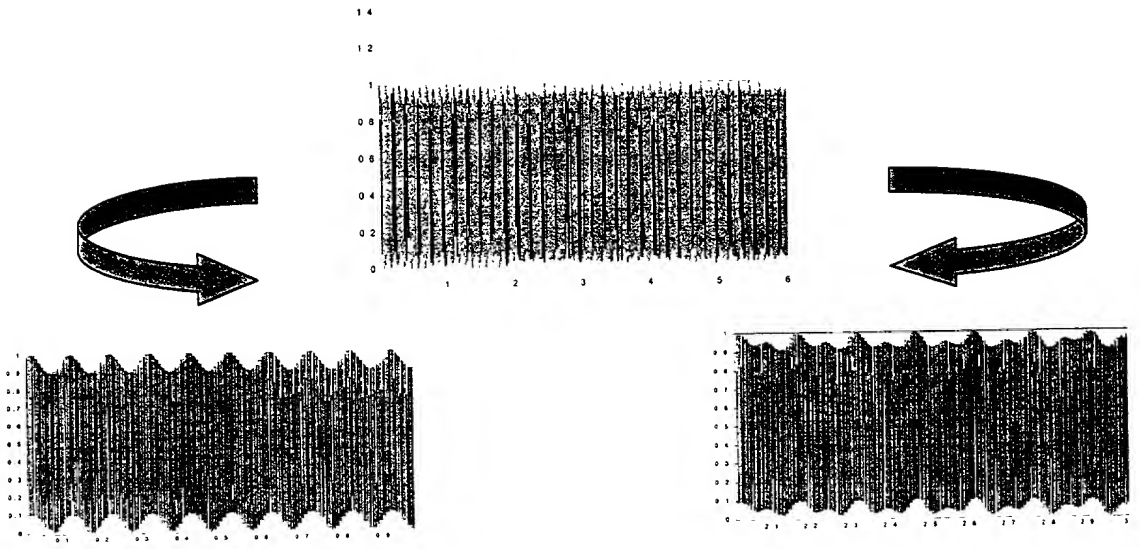


FIG. 34

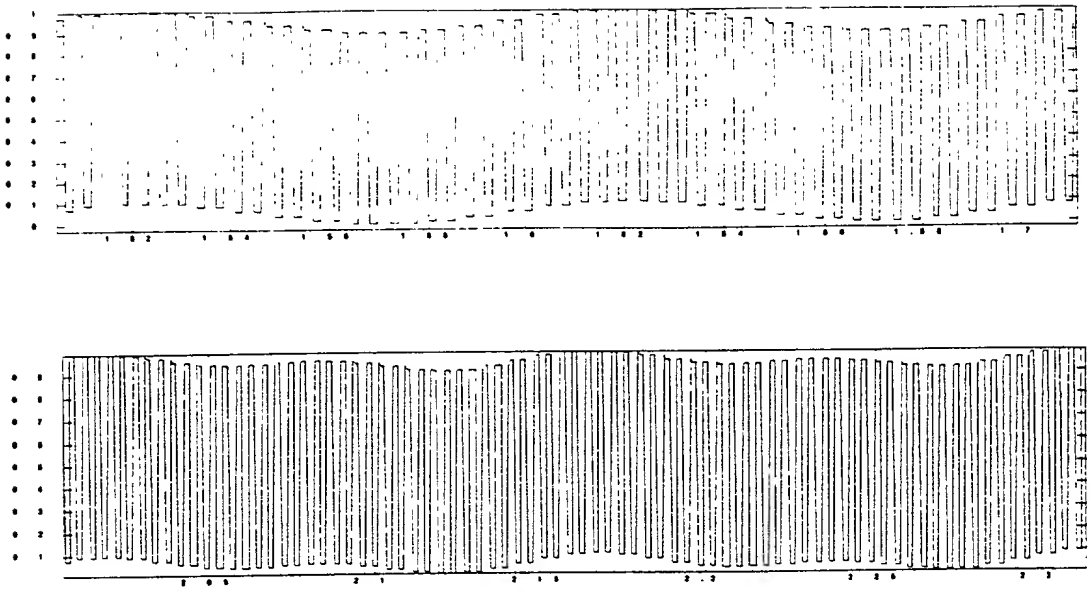


FIG.35

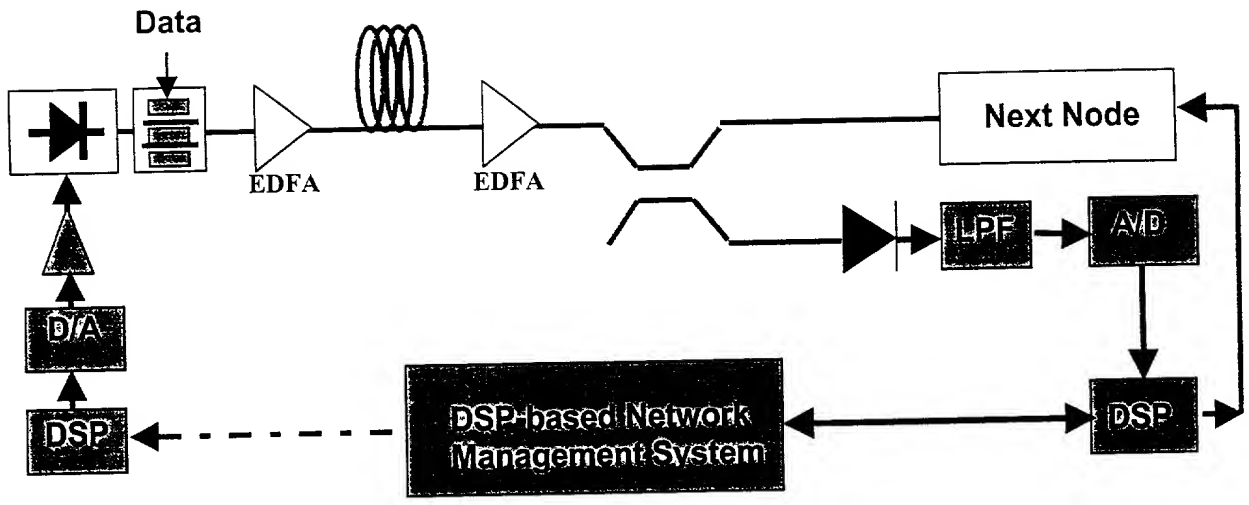

Data
EDFA
EDFA
Next Node
LPF
A/D
D/A
DSP
DSP-based Network Management System
DSP

FIG. 36

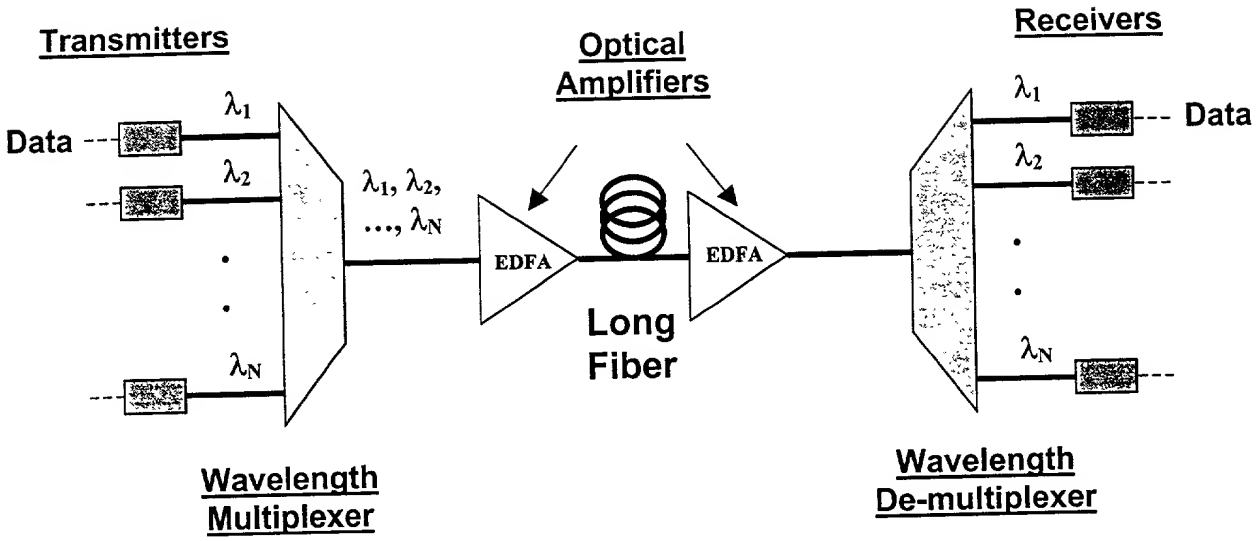

Transmitters
Optical Amplifiers
Receivers
Data
λ_1
λ_2
λ_N
$\lambda_1, \lambda_2, \ldots, \lambda_N$
EDFA
EDFA
Long Fiber
Data
λ_1
λ_2
λ_N
Wavelength Multiplexer
Wavelength De-multiplexer

FIG. 37

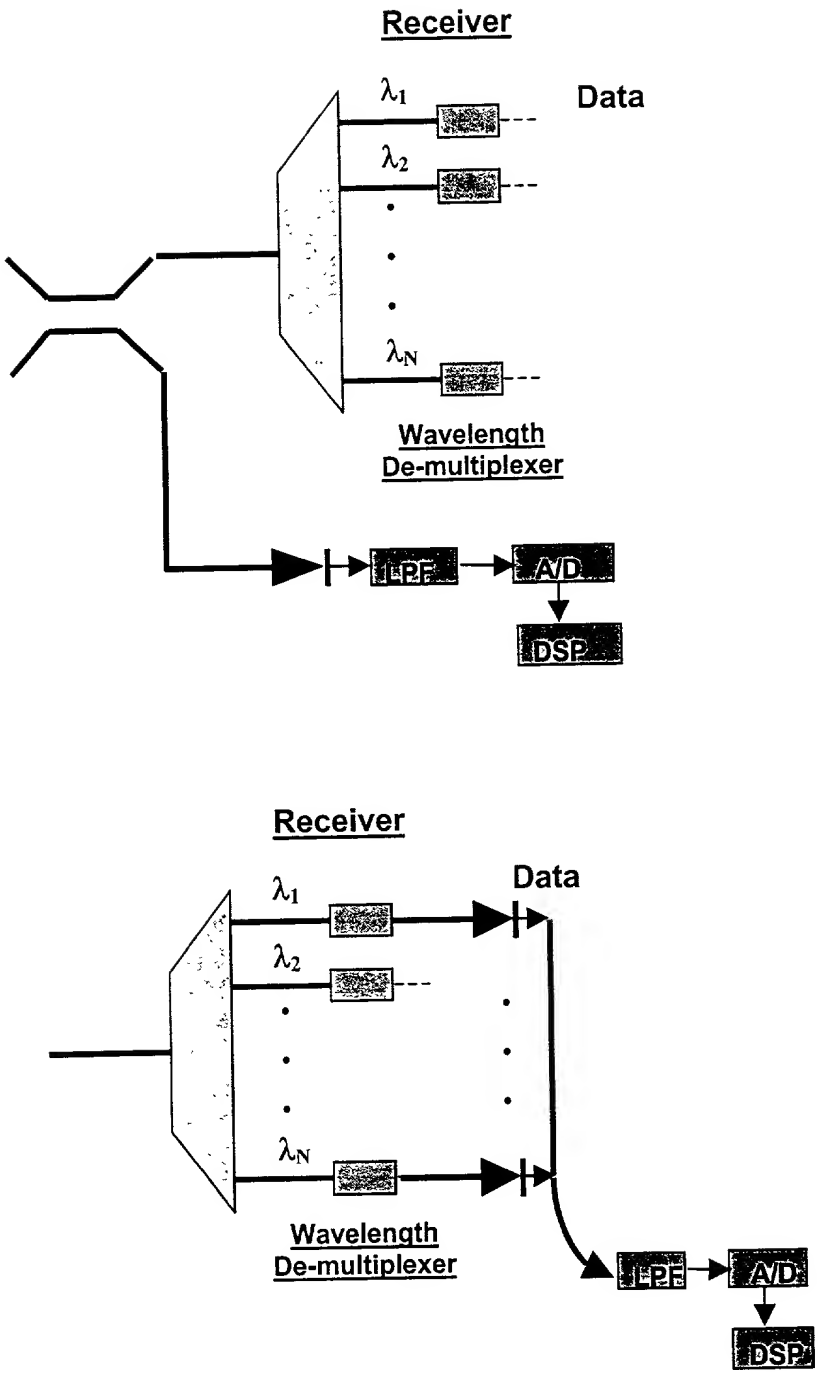

Receiver
λ_1
Data
λ_2
λ_N
Wavelength
De-multiplexer
LPF
A/D
DSP
Receiver
Data
λ_1
λ_2
λ_N
Wavelength
De-multiplexer
LPF
A/D
DSP

FIG. 3B

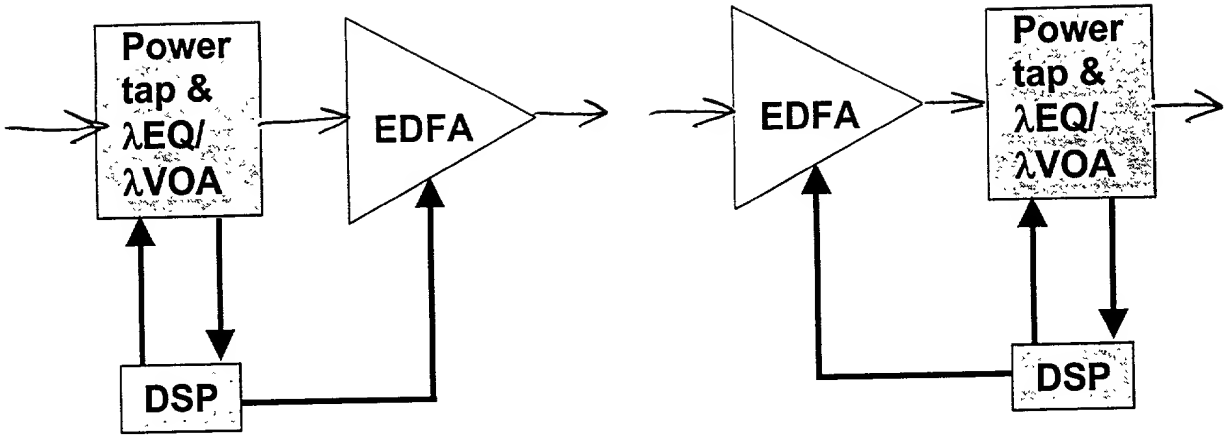


FIG. 39

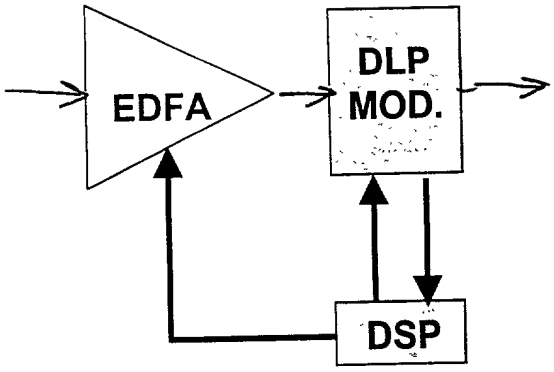


FIG. 40

Docket No. 9656.0

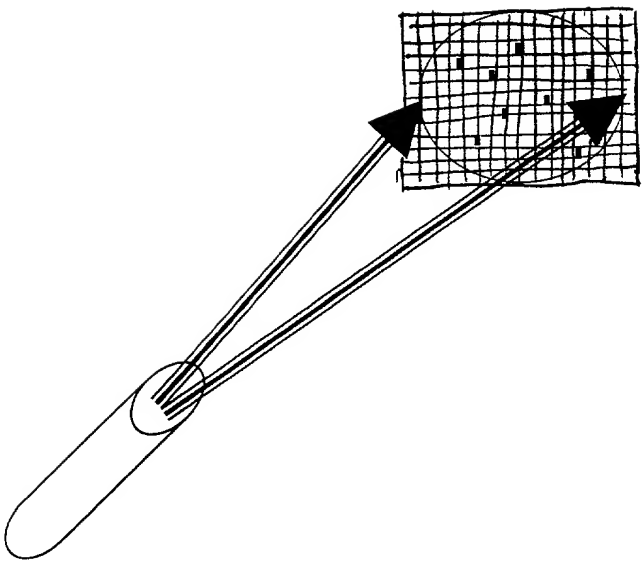


FIG. 41

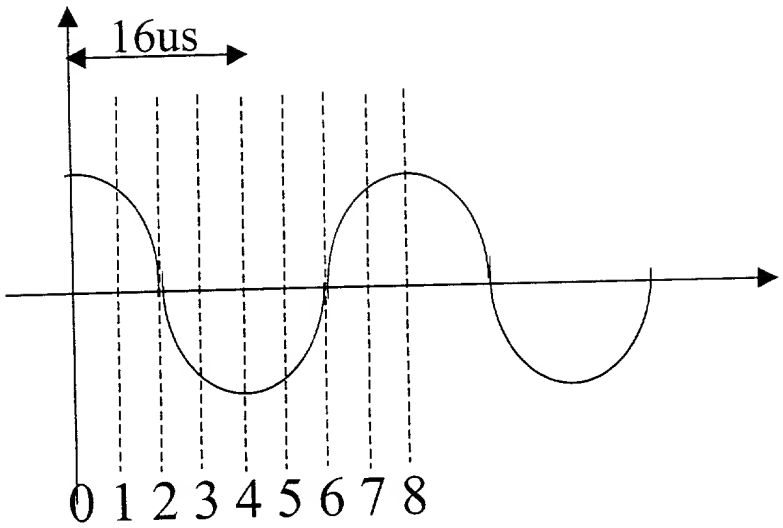


FIG. 42

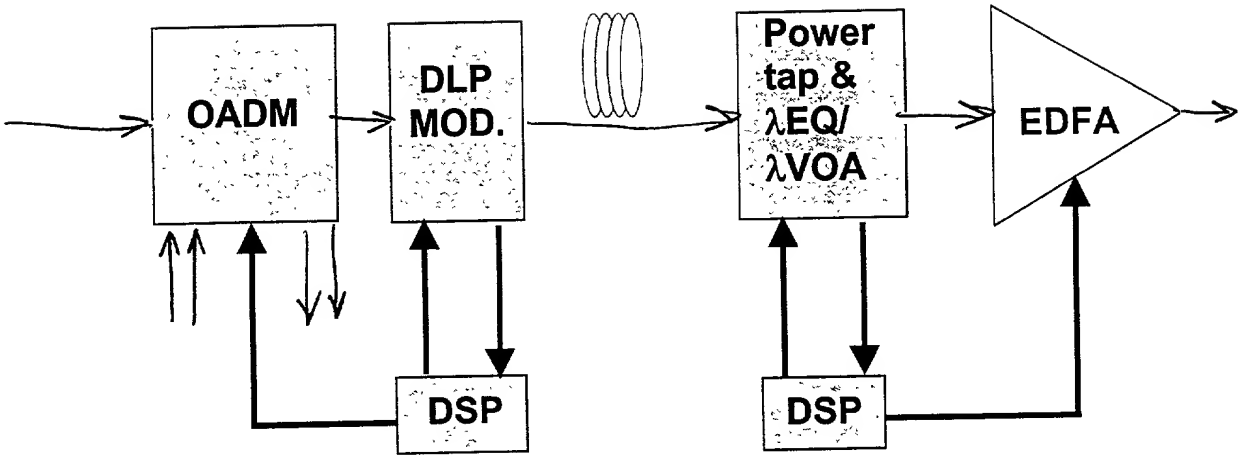


FIG. 43

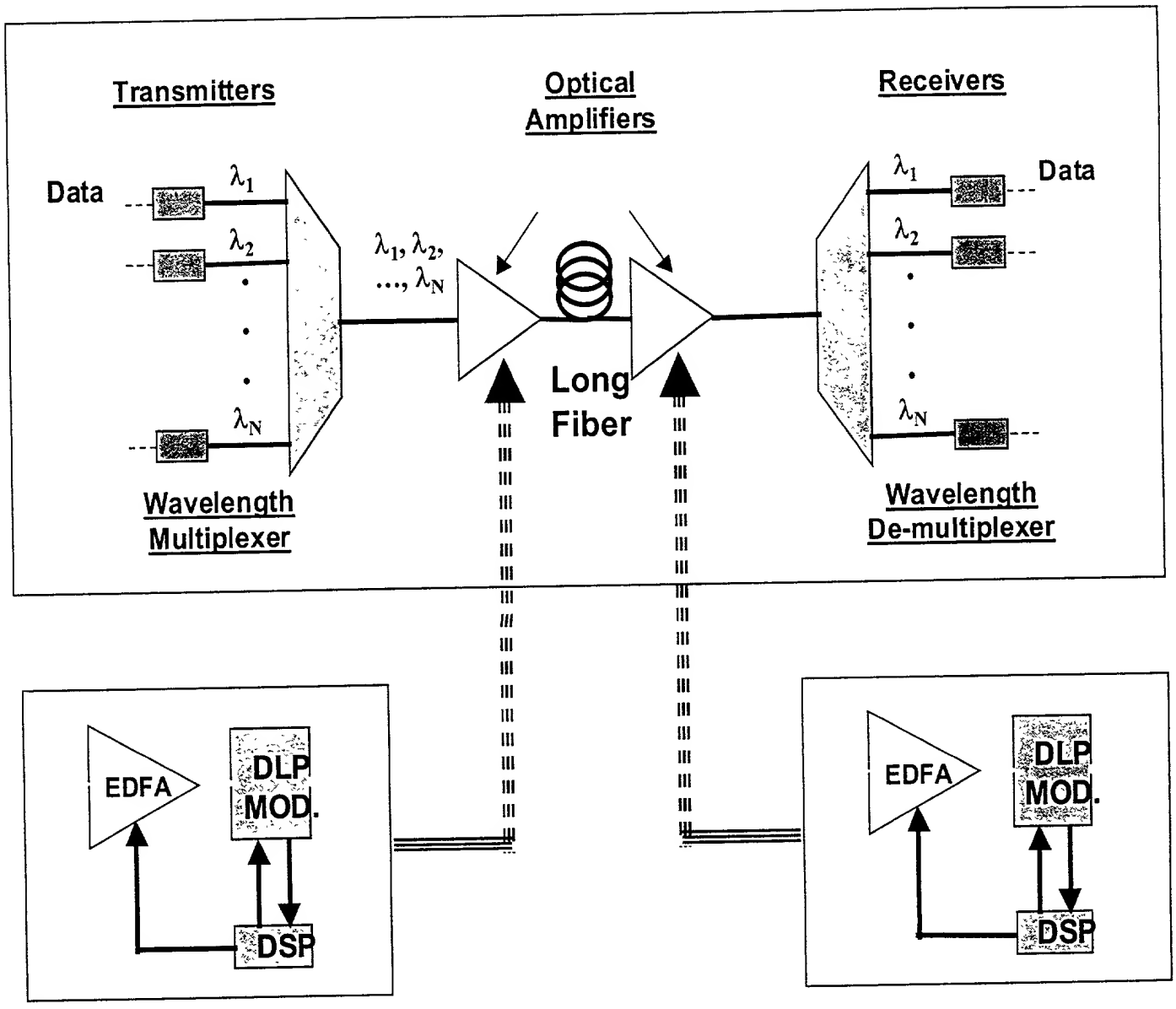

Transmitters
Optical Amplifiers
Receivers
Data
λ_1
λ_2
λ_N
$\lambda_1, \lambda_2, \ldots, \lambda_N$
Long Fiber
Data
λ_1
λ_2
λ_N
Wavelength Multiplexer
Wavelength De-multiplexer
EDFA
DLP MOD.
DSP
EDFA
DLP MOD.
DSP

FIG. 44

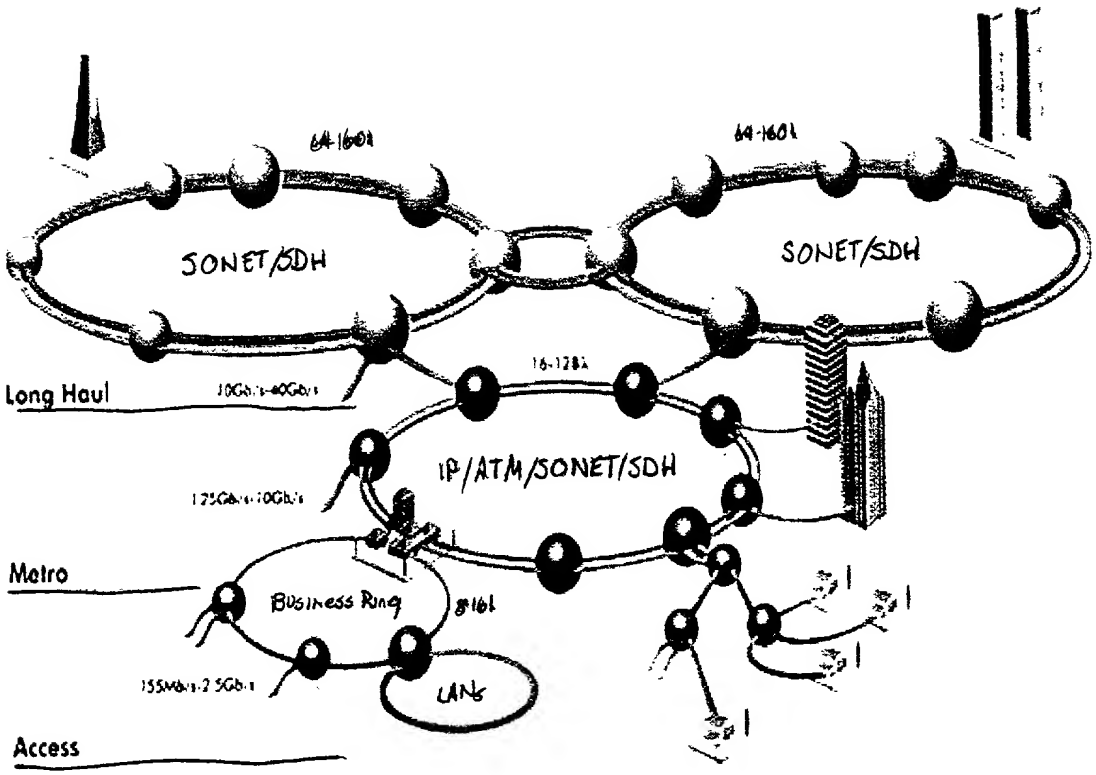

SONET/SDH
SONET/SDH
Long Haul
IP/ATM/SONET/SDH
Metro
Business Ring
LANs
Access

FIG. 45

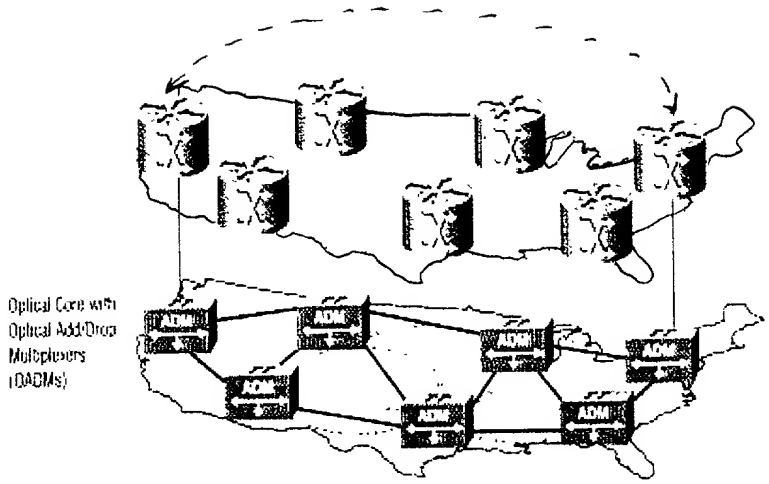


FIG. 46

US 6,868,225 B2

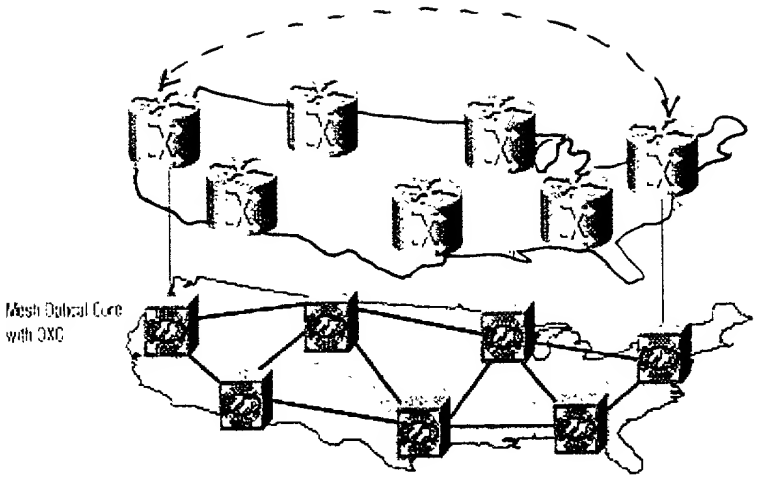


FIG. 47

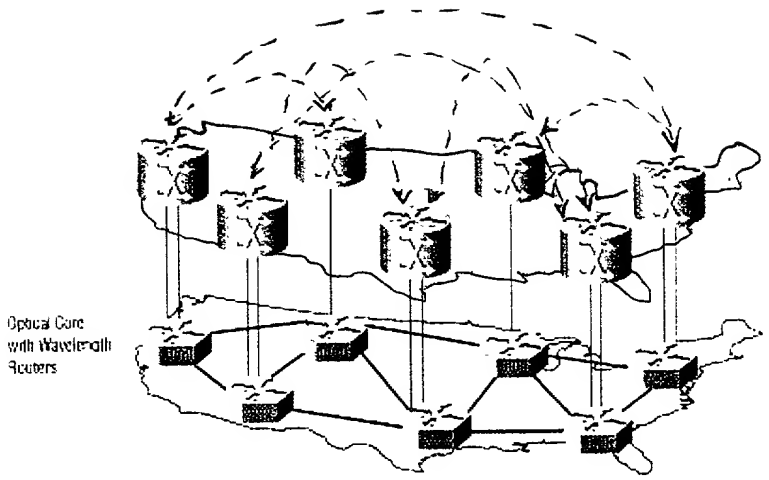


FIG. 4B

FOR PUBLIC DISCLOSURE

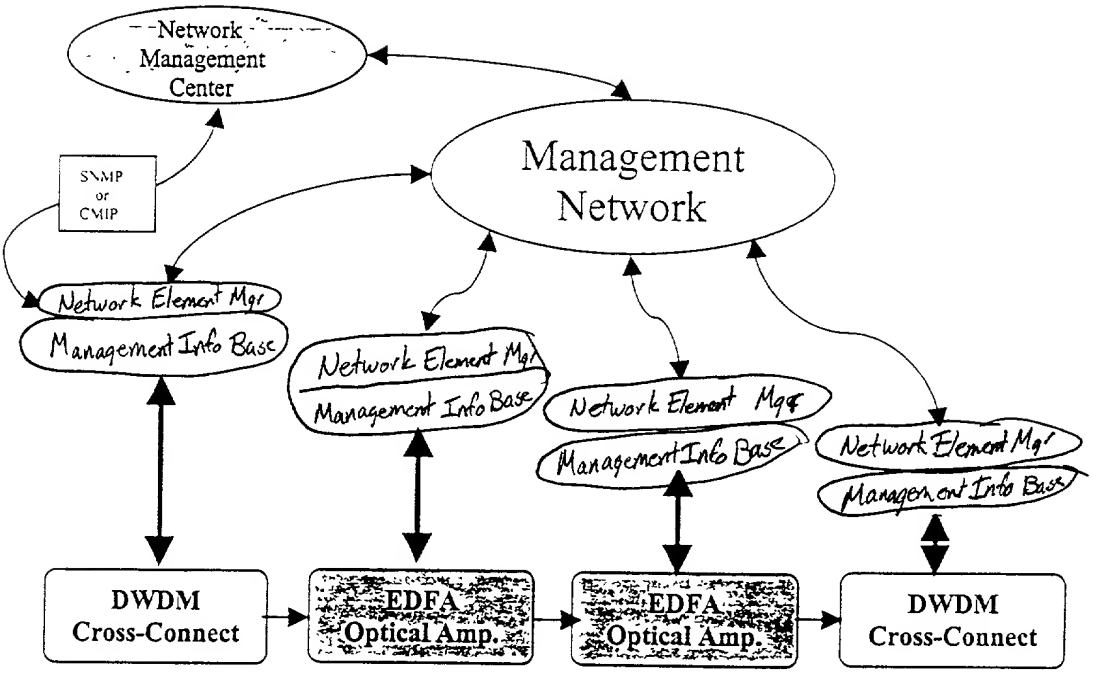

Network Management Center
SNMP or CMIP
Management Network
Network Element Mgr
Management Info Base
Network Element Mgr
Management Info Base
Network Element Mgr
Management Info Base
Network Element Mgr
Management Info Base
DWDM Cross-Connect
EDFA Optical Amp.
EDFA Optical Amp.
DWDM Cross-Connect

FIG. 49

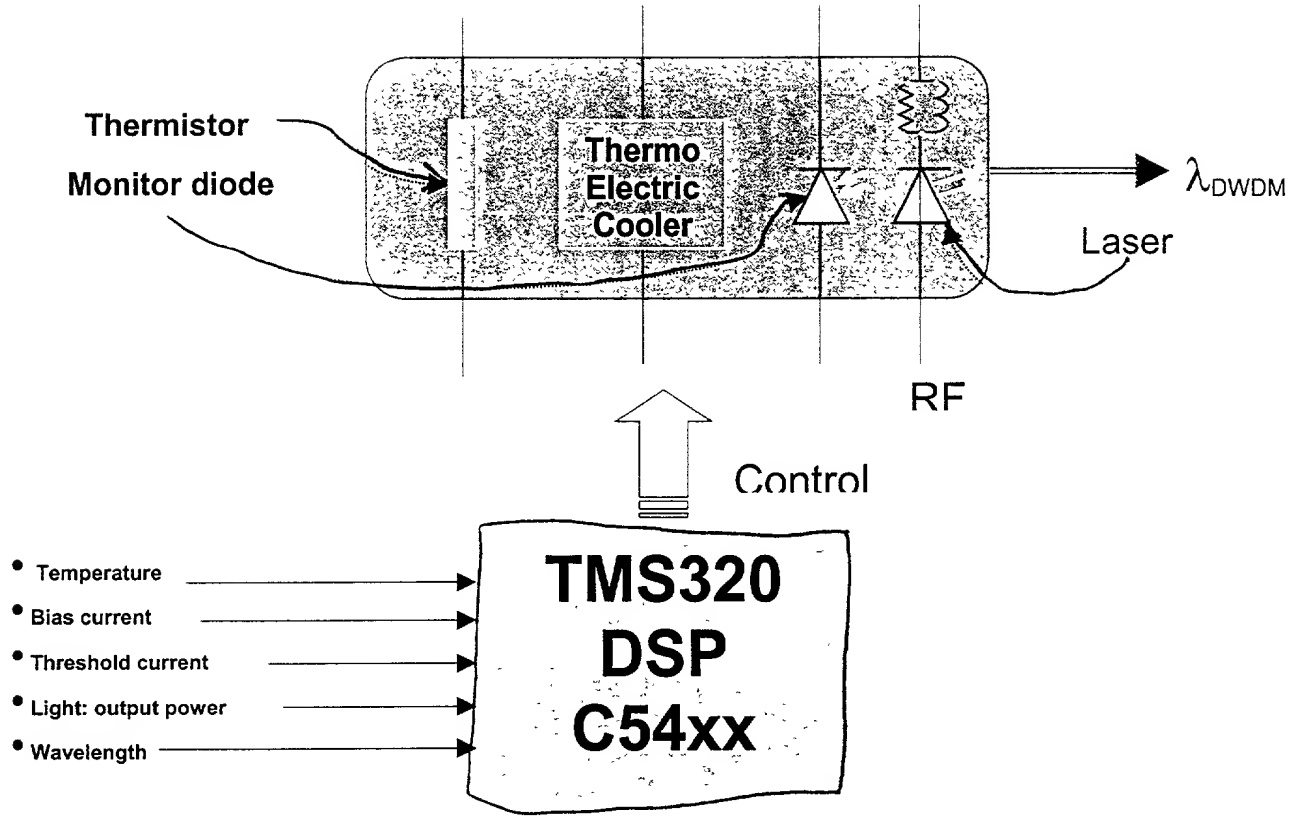


FIG. 50

Docket No. 50277-2014

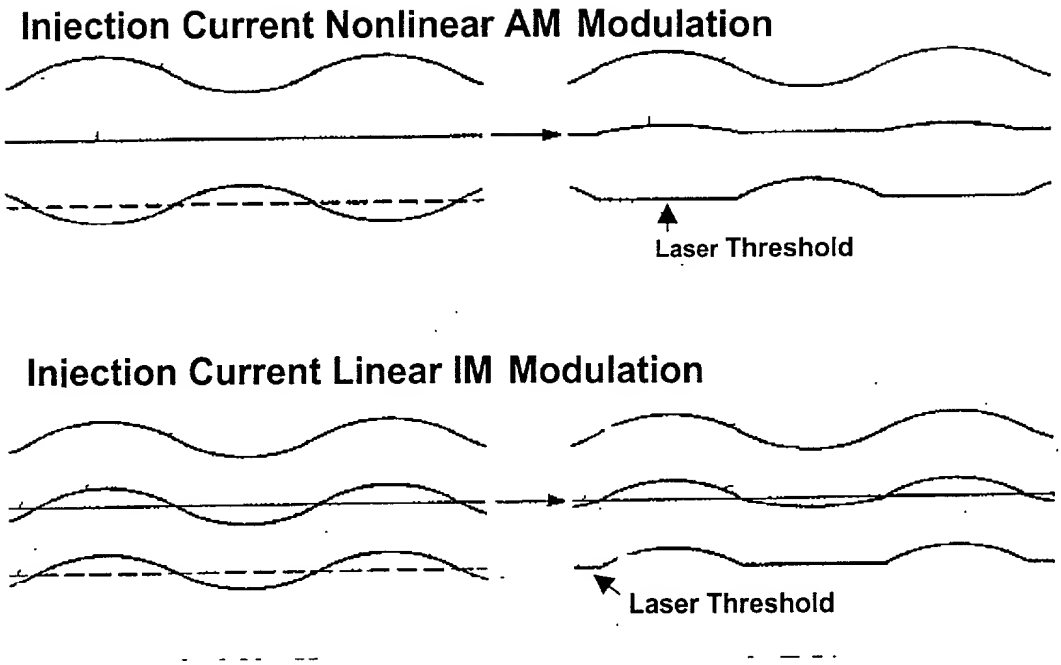

Injection Current Nonlinear AM Modulation
Laser Threshold
Injection Current Linear IM Modulation
Laser Threshold

FIG. 51

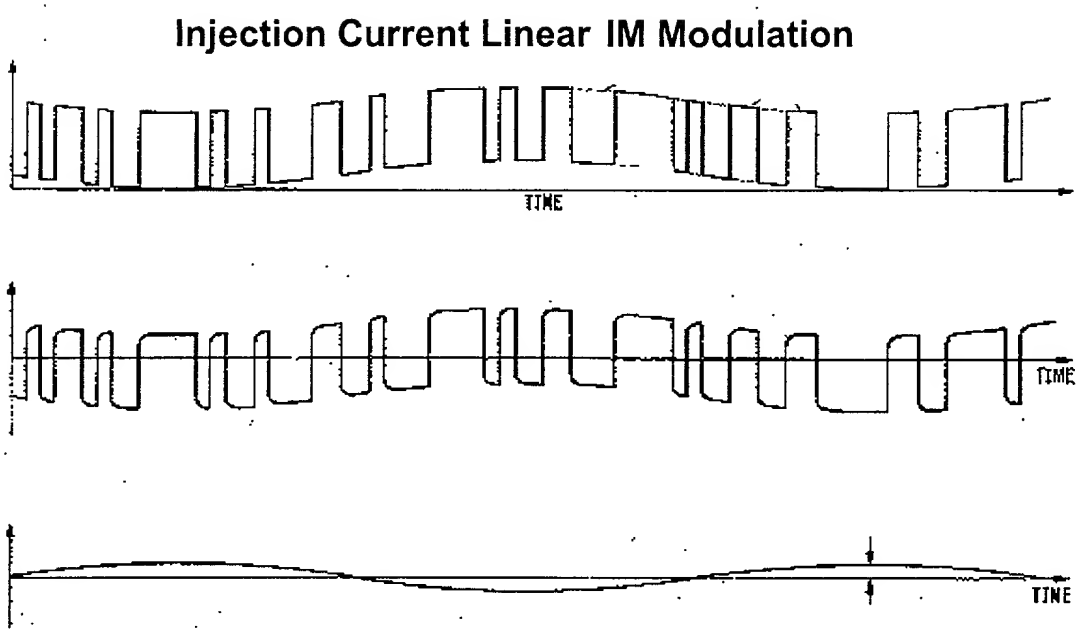


FIG. 52

Patent Application Publication

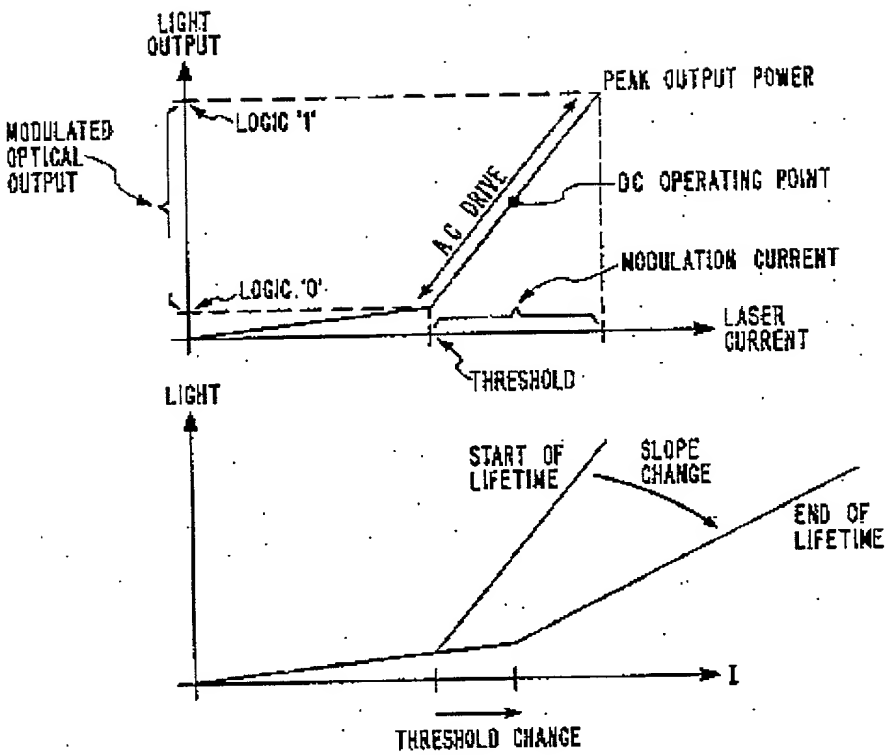


FIG. 53

US 6,259,850 B1

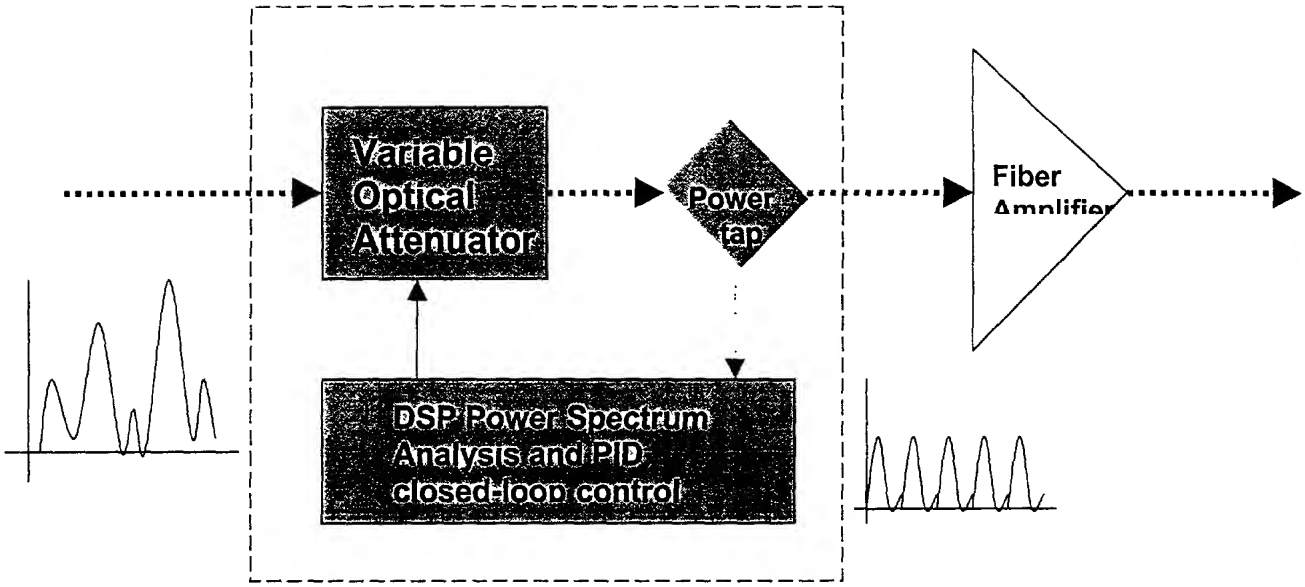


FIG. 54

Patent Application Publication

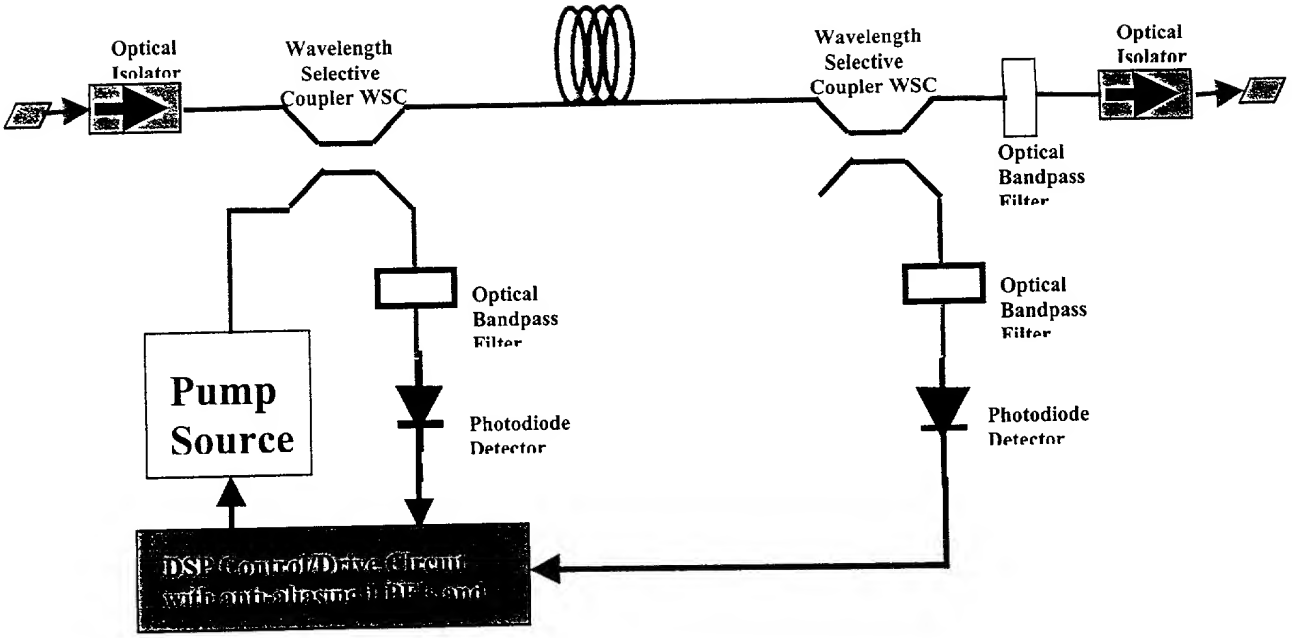

Optical Isolator
Wavelength Selective Coupler WSC
Wavelength Selective Coupler WSC
Optical Isolator
Optical Bandpass Filter
Optical Bandpass Filter
Optical Bandpass Filter
Pump Source
Photodiode Detector
Photodiode Detector

Fig. 55

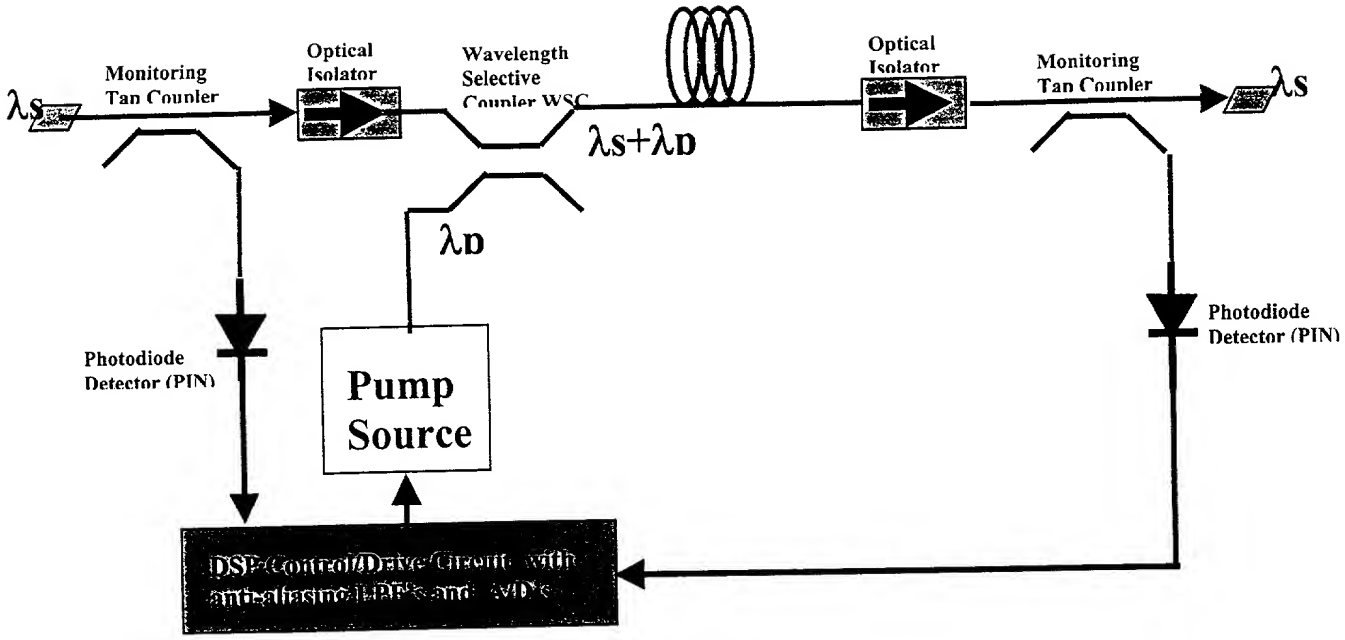

λs
Monitoring
Tap Coupler
Optical
Isolator
Wavelength
Selective
Coupler WSC
λs+λp
Optical
Isolator
Monitoring
Tap Coupler
λs
λp
Photodiode
Detector (PIN)
Pump
Source
Photodiode
Detector (PIN)

FIG. 56

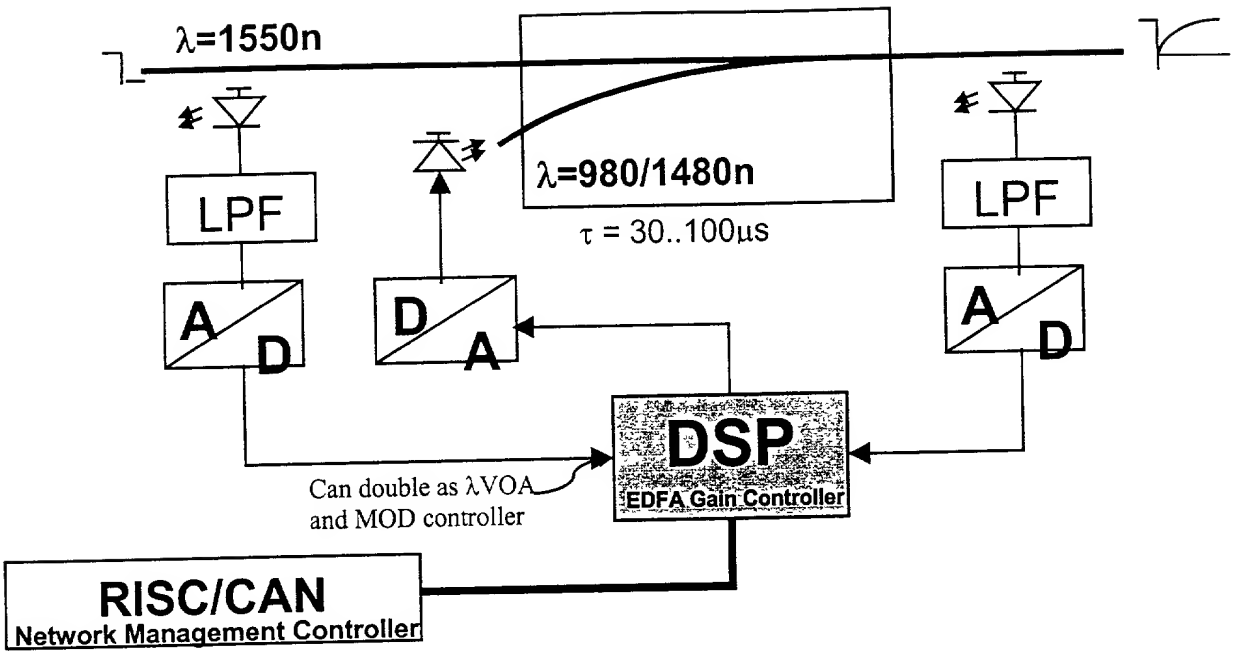

λ=1550n
λ=980/1480n
τ = 30..100μs
LPF
LPF
A
D
D
A
A
D
DSP
EDFA Gain Controller
Can double as λVOA
and MOD controller
RISC/CAN
Network Management Controller

FIG. 57